New Claims (June 13, 2005):

1. A device (1) for separating impurities from the lubricating oil of an internal combustion engine, said device (1) comprising a filter element (2) at its bottom and, on top of said filter element (2), a centrifuge (3) with a rotor (31) drivable by means of lubricating oil flowing therethrough, wherein said filter element (2) and said centrifuge (3) are arranged, one above the other, in a common two-piece housing (4) that is closed during operation of the device (1) and comprises a removable upper screw cap (41) and a stationary lower housing part (42), wherein a removable intermediate cap (5) is arranged in the housing (4) between said filter element (2) and said centrifuge (3), and wherein said centrifuge (3), said intermediate cap (5) and said filter element (2) can be removed from the housing (4) while the latter is in its open state,
c h a r a c t e r i z e d i n t h a t
the screw cap (41) and the intermediate cap (5) comprise detachable connection means (45, 54; 34, 43') that can be brought in engagement with each other and are intended to transmit axial tractive forces or axial tractive and compressive forces.

2. A device according to Claim 1, characterized in that, by rotating the screw cap (41) in its loosening rotational direction (41') in relation to the

intermediate cap (5), the connection means (45, 54; 34, 43') can be brought in engagement with each other and, by rotating the screw cap (41) in its tightening rotational direction (41'') in relation to the intermediate cap (5), can be brought out of engagement with each other.

3. A device according to Claim 1 or 2, characterized in that the connection means (45, 54) connecting the screw cap (41) and the intermediate cap (5) that are formed as rotary connection means are designed in the form of a bayonet lock or as a short-length thread.

4. A device according to Claim 2 or 3, characterized in that the intermediate cap (5) has the shape of a bell and comprises at its outer perimeter axially extending ribs (56') each of which is provided with at least one broadening or aperture pointing in circumferential direction and is designed as connection means (54) and that the screw cap (41) comprises at its lower edge hooks (44) or noses that are pointing in its loosening rotational direction (41') and are provided as connection means (45) and can be brought in engagement with the broadenings or apertures (54) by rotating the screw cap (41) in its loosening rotational direction (41') in relation to the intermediate cap (5) and can be brought out of engagement by rotating the screw cap (41) in its tightening rotational direction (41'') in relation to the intermediate cap (5).

5. A device according to Claim 4, characterized in that the ribs (56') that comprise the broadenings or apertures (54) are, at the same time, used as stabili-

zation and force diverting ribs for reinforcing the intermediate cap (5) and for diverting onto the screw cap (41) such forces that are caused by an oil pressure below the intermediate cap (5) in the interior region of the housing (4).

6. A device according to Claim 2 or 3, characterized in that the intermediate cap (5) has the shape of a bell and, in a radially outward direction, comprises at its upper side a plurality of axially extending wings (56) that are pointing in upward direction and are spaced apart from each other in circumferential direction, wherein each of said wings (56) is formed to have as connection means (54) at least one broadening or aperture pointing in circumferential direction or one recess pointing in a radially inward direction and that, at its lower edge, the screw cap (41) comprises as connection means (45) hooks (44) or noses extending in its loosening rotational direction (41') or in a radially inward direction, wherein said hooks (44) or noses can be brought in engagement with the connection means (54) of the intermediate cap (5) by rotating the screw cap (41) in its loosening rotational direction (41') in relation to the intermediate cap (5) and can be brought out of engagement with the connection means (54) of the intermediate cap (5) by rotating the screw cap (41) in its tightening rotational direction (41'') in relation to the intermediate cap (5).

7. A device according to Claim 6, characterized in that the connection means (45) of the screw cap (41) on the one hand and the wings (56) with the connection means (54) of the intermediate cap (5) on the other hand are arranged and designed such that, with the

intermediate cap (5) being already inserted in the housing (4), they overlap each other in axial direction when the screw cap (41) is placed onto the stationary housing part (42) before the thread engagement thereof.

8. A device according to Claim 6 or 7, characterized in that the wings (56) are, at their radially outer end, provided with a guide contour (58) that fits in the interior region of the screw cap (41) with a motional play.

9. A device according to anyone of Claims 6 to 8, characterized in that a step (59) is provided at or next to each of the wings (56), said step (59) projecting in a radially outward direction and forming the basis on which a section of the lower edge (49) of the screw cap (41) is supported when the latter is in the tightened state.

10. A device according to Claim 9, characterized in that each of the steps (59), at least in part, comprise an edge (59') projecting in upward direction at its end pointing in the loosening rotational direction (41') of the screw cap (41).

11. A device according to Claim 10, characterized in that a continuous or broken sliding ramp (59'') is provided for the lower edge (49) of the screw cap (41), said sliding ramp (59') being arranged at the level of said edge (59') and, as seen in the tightening rotational direction (41'') of the screw cap (41), in front of each of the steps (59) at the intermediate cap (5) that comprise at least one edge (59').

12. A device according to anyone of Claims 6 to 11, characterized in that the wings (56) are connected to each other via a continuous circumferential collar or are joined to form a continuous circumferential collar.

13. A device according to anyone of Claims 4 to 12, characterized in that the broadenings or apertures (54) on the one hand and/or the hooks (44) or noses on the other hand are formed to have a slope or step (47) at their surfaces engaging each other, said slope or step (47) securing the engaged position.

14. A device according to anyone of the preceding claims, characterized in that the screw cap (41) is formed to have strengthening ribs (49') at its inner perimeter, at least in the region of its connection means (45).

15. A device according to anyone of Claims 1 to 14, characterized in that the intermediate cap (5) and the filter element (2), as seen in relation to each other, are non-connected component parts of the device (1) and the intermediate cap (5) and/or the filter element (2) are/is designed without connection means.

16. A device according to anyone of the preceding claims, characterized in that the screw cap (41) and/or the intermediate cap (5) are each single-piece injection-molded parts of plastic.

17. A device according to anyone of the preceding claims, characterized in that the screw cap (41)

and/or the intermediate cap (5) are each single-piece die castings of light metal.

18. A device according to Claim 1 or 2, characterized in that

- that the device (1) is designed with a broken centrifuge bottom (33) that forms a part of the intermediate cap (5) and permits lubricating oil coming out of the rotor (31) to flow therethrough,
- that the centrifuge bottom (33) comprises in its center a holding (35) for a lower pivot bearing or a lower axle end of the rotor (31), and
- that the centrifuge bottom (33) is designed at its outer perimeter and at least in its upper part with an annular external thread (34) that can be screwed into a mating internal thread (43') in the interior region of the screw cap (41).

19. A device according to Claim 18, characterized in that the centrifuge bottom (33) and the intermediate cap (5) can be formed integrally with each other.

20. A device according to Claim 18, characterized in that the centrifuge bottom (33) and the intermediate cap (5) can each be formed as a separate component which can be brought in an axially extending and sealing plug or screwed connection which transmits axial tractive forces or axial tractive and compressive forces.

21. A device according to Claim 20, characterized in that an adapter piece (6) that is hollow in its ax-

ial direction is inserted between the centrifuge bottom (33) and the intermediate cap (5), the lower part (62) of said adapter piece (6) centrally engaging the intermediate cap (5) and the upper part (61) of said adapter piece (6) centrally engaging the centrifuge bottom (33), wherein the outer perimeter (60) of the adapter piece (6) has a spherical contour in its upper and/or lower part (61, 62), permitting rotation of the adapter piece (6) in relation to the axial direction to a limited extent.

22. A device according to Claim 21, characterized in that the adapter piece (6) comprises at its outer perimeter (60) a projecting band or collar (64) between its lower part (62) and its upper part (61).

23. A device according to Claim 21 or 22, characterized in that the adapter piece (6) comprises in its lower part (62) a plurality of axially extending flexible locking arms (65) with locking noses (65') which permit engaging insertion of the adapter piece (6) in an oil through opening (52) in the intermediate cap (5).

24. A device according to anyone of Claims 18 to 23, characterized in that, to permit connection of the screw cap (41) and the lower housing part (42) to each other in a detachable manner, the screw cap (41) is designed with an external thread (43.1) and the lower housing part (42) with a mating internal thread (43.2) or the screw cap (41) with an internal thread and the lower housing part (42) with a mating external thread.

25. A device according to anyone of Claims 18 to 24, characterized in that the centrifuge bottom (33) comprises a plurality of arms (33') that are extending in radial direction from the holding (35) to its outer perimeter comprising the external thread (34) and that are spaced apart from each other in circumferential direction.

26. A device according to Claim 25, characterized in that the arms (33') are flat, with their flat planes each being arranged in radial and axial direction.

27. A device according to anyone of Claims 18 to 26, characterized in that the intermediate cap (5) is plugged in the lower part (42) of the housing (4) with an intermediate layer of a radially and/or axially acting seal (55) being placed therebetween.

28. A device according to anyone of Claims 18 to 27, characterized in that, with the housing (4) closed, the intermediate cap (5) is, at its outer perimeter (57), supported in axial direction on the upper side of a step (47') in the inner perimeter of the lower housing part (42).

29. A device according to anyone of Claims 18 to 28, characterized in that the centrifuge (3), the centrifuge bottom (33), the intermediate cap (5) and the screw cap (41) form a pre-assembled unit which can be screwed to the lower housing part (42).

30. A device according to anyone of Claims 18 to 29, characterized in that the screwed connection (43.1, 43.2) between the screw cap (41) and the stationary housing part (42) and the screwed connection (34,

43') between the screw cap (41) and the centrifuge bottom (33) comprise equidirectional threads.

31. A device according to anyone of Claims 18 to 29, characterized in that the screwed connection (43.1, 43.2) between the screw cap (41) and the stationary housing part (42) and the screwed connection (34, 43') between the screw cap (41) and the centrifuge bottom (33) comprise threads of opposite sense.

32. A device according to Claim 30 or 31, characterized in that the screwed connection (34, 43') between the screw cap (41) and the centrifuge bottom (33) has a loosening torque that exceeds the loosening torque of the screwed connection (43.1, 43.2) between the screw cap (41) and the stationary housing part (42).

33. A device according to Claim 30 or 31, characterized in that the screwed connection (34, 43') between the screw cap (41) and the centrifuge bottom (33) has a loosening torque that exceeds the loosening torque between the intermediate cap (5) and the stationary housing part (42).

34. A device according to anyone of Claims 18 to 33, characterized in that a detachable anti-loosening device (36) is provided at least for the screwed connection (34, 43') between the screw cap (41) and the centrifuge bottom (33).

35. A device according to anyone of Claims 18 to 34, characterized in that the intermediate cap (5) and the filter element (2), as seen in relation to each other, are non-connected component parts of the device (1) without any connection means.

36. A device according to anyone of Claims 18 to 34, characterized in that the intermediate cap (5) and the filter element (2) comprise detachable second connection means (23, 53) for the transmission of axial tractive forces that can be brought in engagement with each other.

37. A device according to Claim 36, characterized in that the second connection means (23, 53) are designed as locking connection means.

38. A device according to Claim 36, characterized in that the second connection means (23, 53) are designed as screwed connection or bayonet-type connection or rotary connection.

39. A device according to anyone of Claims 18 to 38, characterized in that the housing (4), the centrifuge bottom (33), the intermediate cap (5) and the adapter piece (6) are plastic or light metal parts manufactured in an injection-molding process.

- - -